

Unit 3 Aqueous Brake Washing

Baseline: Solvent Brake Washing

Option 1: Aerosol cans of brake cleaner

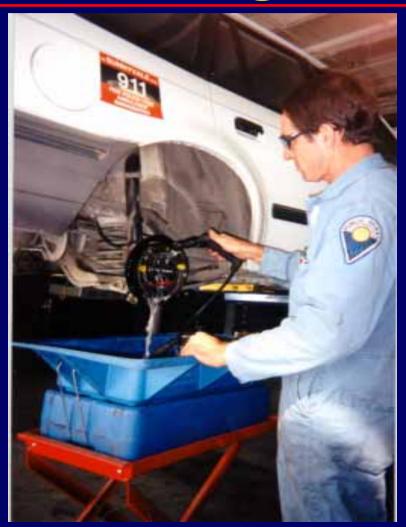
Option 2: Roll-up solvent washers

Environmental Concerns

- Solvent emissions cause smog formation
- Spent solvents are hazardous waste
- Aerosol product use increases worker exposure
- Empty aerosol cans bulky, nonbiodegradeable waste
- Solvent-contaminated rags

P2 Alternative: Aqueous Brake Cleaning

- Avoid final shot of aerosol brake cleaner
- Use compressed air for drying
- Consider units that adjust in height



Waste Management

- Shop manager is responsible for determining whether waste is hazardous
- Some vendors will dispose of solution for you
- Avoid contaminating with aerosol products
- Informal Bay Area Survey: solution change every 3 years

Typical Scenario

- > 20 brake jobs / month
- Payback < 2 years</p>
- Assumptions

Aerosol brake cleaner \$2 / can

1 can / job

Aqueous unit \$800

Aqueous cleaner \$25

Disposal: solution and filters \$30/ yr.

Case Studies

- 1997 Southern California
- Shop size: small to large (3-35 employees)
- Number of brake jobs per week: 3-25
- Baseline annual cost of aerosol & mineral spirit cleaning: \$117 - \$1957

Case Studies

- Types of cleaning units tested:
 - heated or cold
 - wheeled
 - batch and single job
- Variety of cleaners used:
 - enzyme
 - detergent based

Case Studies Annual Cost Savings

- About 20% to 80% annual cost savings for all test shops
 - compared to aerosol brake cleaners
- Highest volume shop: about 80% annual cost savings
- Full report and 1 page case studies: http://home.earthlink.net/~irta/rprt0005.html

Chlorinated Product Ban

- Automotive maintenance and repair facilities
- State regulation bans the sale and use of:
 - Perchloroethylene (Perc)
 - Methylene chloride (MeCI)
 - Trichloroethylene (TCE)
- Aerosols and bulk liquid product ≤ 2 gal.
- Effective dates, beginning:
 - Sale: July 1, 2002
 - Final sell through date
 - Use: January 1, 2003

Chlorinated Product Ban

- Regulations and More Information ARB
 - Rulemaking Update http://www.arb.ca.gov/regact/regup00.htm#amr
 - Fact Sheet, Workshop Summary http://www.arb.ca.gov/toxics/amr.htm
 - Final Rulemaking
 - Approved and Filed April 4, 2001
 - http://www.arb.ca.gov/regact/amr/amr.htm

Caution!! Alternatives to Chlor. Solvents

- Phase out of chlorinated solvents may result in the increased use of other products can cause adverse health effects
- Many automotive products contain Hexane
 - brake cleaners, degreasers
 - aerosol and bulk
- Debilitating illness can result from exposure to Hexane - Peripheral Neuropathy

Hexane - Caution

- mixture of isomers
 - 20-80% n-hexane (normal hexane)
- n- hexane well documented neurotoxin
- Inhalation main route of exposure
 - dermal contact exposure
- Exposure Symptoms:
 - numbness in extremities
 - decreased grip strength dropping tools

Hexane Worker Exposures

- California DHS OHB, Health Evaluation
 Systems and Information Services (HESIS)
 - Case Studies chronic exposures
 - Working with Machinists Union
 - Publications n-hexane health advisory http://www.dhs.ca.gov/ohb/HESIS/nhexane.pdf
- Aqueous cleaning system = alternative

Take Home Messages

- Performance ≥ other methods
- Lower / no worker exposures
 - Pay attention to substitutions
- Do not cross-contaminate
- Can save \$\$ compared to aerosols